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Allen, Jonathan P.

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# **INCLUSIVE INNOVATION AND ENTREPRENEURSHIP IN THE NEW DIGITAL ERA**

**Jonathan P. Allen**

University of San Francisco  
San Francisco, California, USA  
jpallen@usfca.edu

## **ABSTRACT**

The intensive digitization of society has coincided with rising economic inequality across the developed economies. Missing from the standard list of policy responses to rising inequality is the role of innovation and entrepreneurship. This paper argues that new digital business models, that capture value differently and share the wealth created more broadly, will be a necessary part of addressing technology-based inequality. This in turn will require more support for inclusive innovation and entrepreneurship, which will allow novel, alternative value models to emerge, and be given a chance to compete and succeed. Using a three-part model of the main modes of performance in the digital era—datafication, algorithms, and platforms—the paper will discuss skills and intervention that might help in making digital innovation and entrepreneurship more inclusive.

## **KEYWORDS**

Technology-based inequality; Inclusive innovation; Inclusive entrepreneurship; Digital business models

## 1 INTRODUCTION

The intensive digitization of society has coincided with rising economic inequality across the developed economies. The standard list of proposed responses to technology-based inequality include: education for new job skills; regulatory changes such as taxation, antitrust enforcement, and intellectual property reform; and technology inclusion initiatives for under-represented groups (Allen, 2017).

While these proposals are welcome, what is missing from the standard list of responses is the role of innovation and entrepreneurship in addressing technology-based inequality. The share of GDP paid in wages to labor is shrinking across developed economies, which, combined with the hollowing out of middle skill jobs (Autor, Dorn, Katz, Patterson, & Van Reenen, 2017), places limits on how much labor market upskilling alone can remedy inequality. On the business side, the ability of new entrants to challenge established digital platforms and ecosystems for the large profits created by digital transformation appears to be under pressure.

This paper argues that new digital business models, capturing value differently and sharing the wealth created more broadly, will be a necessary part of addressing technology-based inequality. This in turn will require more support for inclusive innovation and entrepreneurship, which will allow novel, alternative value models to emerge, and be given a chance to compete and succeed. Using a three-part model of the main modes of performance in the digital era—datafication, algorithms, and platforms—the paper will discuss skills and interventions (Allen, 2019) that might assist in making digital innovation and entrepreneurship more inclusive.

## 2 INNOVATION, ENTREPRENEURSHIP, AND TECHNOLOGY-BASED INEQUALITY

The intensive digitization of societies and economies has created tremendous economic value (Allen, 2017) which, when captured by a specific business or organization, becomes economic wealth. Studies of business strategy and entrepreneurship have long distinguished between value creation and value capture (Bowman & Ambrosini, 2000)—the inventor who creates a brilliant new device may or may not profit from their invention, depending on the mechanisms they use to capture part of the value they have created.

Private sector wealth in the past four decades has shifted from primary economic sectors (such as energy, commodities, and materials) to the more virtualized sectors of digital technology and finance, as measured by stock market capitalization. A challenge for increasingly unequal economies is to make digital wealth creation more inclusive. Despite the scarcity of digital job skills, labor markets alone have not been successful in sharing digital wealth more broadly. It is likely that the ways that businesses create, capture, and share economic value—their *business models*—will need to evolve and change. New business models, guided by different values, are more likely to emerge if innovation and entrepreneurship in the business sector is more inclusive of people with different values and goals.

While the past 40 years of intensive digitization has not led to self-corrections in economic inequality, digitization may be entering a new chapter where the pressures toward wealth concentration may be even more intensified—our new era of ‘data science’.

### 3 THE NEW DIGITAL ERA

The digital era we have known of the past 40-50 years can be summarized by three key value creation processes, or *modes of performance*: Information, Automation, and Communication. Information is the capture of representations of the world, and the relationships between them, that allow things to be processed and stored digitally. Automation is the replacement of a real-world process by its digital equivalent. Communication is the error-free transfer of information from a sender to a receiver. Each of these processes creates economic value by exchanging ‘bits for atoms’, making activities potentially millions of times faster and cheaper.

These traditional digitization processes can be thought of as laying the groundwork for a new digital era of ‘data science’. The analogous modes of performance in this new era can be characterized as Datafication, Algorithms, and Platforms. Rather than explicitly capture and model (somewhat scarce) information, the datafication process creates an abundance of data, composed of the data traces left behind by all digital activity, human and non-human. Value is created by finding unique insights across this vast and growing data landscape. Algorithms, rather than being step-by-step replacements of previous processes, are prediction engines that, with enough data, are able to train themselves through machine learning techniques. And platforms, rather than focusing on point-to-point communications, provide a digital space to connect people and technology through digital mediation (Allen, 2017).

A quick example to illustrate the difference between the previous and new digital era: the Amazon ‘Echo Dot’ home smart speaker. In terms of the original information era, the Echo Dot creates value by assembling an impressively cheap processor, memory, audio processor chip, and WiFi radio for connecting with fast home networks in turn connected to the Internet. Sophisticated voice recognition in the home comes courtesy of the Amazon Lex cloud-based service

that offers natural language translation for less than one US cent a request. This allows home entertainment tasks and purchases to be automated through voice, using a device costing less than \$40 US. Viewed as a new digital era device, however, the Echo Dot depends on the use of natural language algorithms, trained through massive conversational and written data sets. This encourages the constant collection of new data, along with the mining of existing data sources collected for completely different purposes, as seen in the recent case of Alexa training using reddit.com conversations, leading to a recommendation to ‘kill your foster parents’ (Durkin, 2018). The Echo Dot is connected to the Amazon commerce platform, which has complete control over which products consumers see for sale. Voice commands make the mediation effect even stronger, as consumers are usually only presented with a single choice through an audio interface. The value created and shared depends greatly on the datafication, algorithms, and the platforms used.

Key to the economics of this new digital era is its enthusiastic embrace by businesses. The transition to the first digital era took place over decades, slowed by return-on-investment calculations that juxtaposed the value of digitization with the massive time and money investments required to create data stores, capture processes, and build a communications infrastructure. Now that these investments are in place, business is engaging in a thorough embrace of digitization that is not only economic, but even cultural. Far from being fearful or anxious of new technology, the business world is embracing the opportunity to turn a resource they now have in abundance (data), and little idea of what to do with it, into a seemingly miraculous source of value through prediction. Based on technology that feels a bit like a magical black box because, at least in the case of neural networks with hidden layers of ‘deep learning’, it kind of is. The new algorithms then become an occasion to restructure and reconfigure their own internal processes, based on the ‘reality’ of data.

In the next three sections, we offer brief examples of how these main performance modes of the new digital era might affect economic inclusion.

#### **4 DATAFICATION AND ECONOMIC INCLUSION**

The data traces left by datafication are being used for new kinds of predictions throughout society and the economy. For inclusion via labor markets, datafication might reinforce existing trends towards the ‘hollowing-out’ of middle skill jobs, leaving behind only a small number of highly skilled quantitative jobs, together with a mass of low-skilled jobs that fill in the gaps of what can be performed automatically. In spite of this predicted trend, we should be on the lookout for new emerging job roles in our increasingly datafied world. For example, both Google (through their YouTube subsidiary) and Facebook will be hiring almost as many content reviewers and curators as engineers over the next few years, according to their hiring plans (Iyengar, 2017).

Another interesting example comes from the world of predictive policing, one of the great data science success stories of recent decades. While predictive policing opens up many questions of bias and reinforcement of the societal status quo, at the level of work it highlights potential new job roles.

A study of policing in the Netherlands has investigated a new job role that stands between the data scientists creating predictive models, and the day-to-day work of police on the streets (Waardenburg, Sergeeva, & Huysman, 2018). This new role, called an ‘intelligence officer’, interprets the output of the predictive model, and assembles a daily briefing for patrol cops that highlights certain information, and combines it with their own unique local knowledge. Wherever gaps appear between prediction models and action, there is the potential for both skilled labor, and for new entrepreneurs to find productive niches.

#### **5 ALGORITHMS AND ECONOMIC INCLUSION**

The modern notion of algorithm, taken from the world of computer science and mathematics, promises greater objectivity and predictive power in a realm of pure mathematical problem solving, while at the same time re-opening classic questions about the control and accountability of technology (Smith & Marx, 1994). Within its calculations are embedded specific choices about the selection of problems (‘requirements’), the definition of desirable outcomes, and selection of data (‘training sets’), each of which reflect the value of the people controlling the algorithm.

One example of entrepreneurship using algorithms is the recent story of Predictim, a startup using social media data to predict whether a potential baby sitter might harm a child (Patterson, 2018). The data engineers founding the startup saw an opportunity to opportunistically scrape pre-existing data (social media posts on Facebook and Twitter) and apply machine learning techniques to create scores predicting potential harmful behavior, drug use, and ‘disrespect’ from potential teenage baby sitters. Unlike in laboratory examples of machine learning, it is unclear that these data science entrepreneurs had any special expertise in human behavior, or any reliable data on whether potential babysitters actually engaged in any of these behaviors. If these tools became widespread, how might it exclude certain classes of baby sitters based on the language of their posts made for entirely different reasons? In the end, the startup was put on hold after being blocked by Facebook and Twitter, illustrating the challenges of relying on the giant technology platforms for value creation.

Another kind of algorithmic example comes from the fashion startup Stitch Fix. Starting as a fully digital company in this new era, it prides itself on being a completely “data-driven clothing company using AI at virtually every aspect

of its business, with its own algorithms department staffed by 100 data scientists.” (Johnson, 2018) As described by its ‘Chief Algorithms Officer’, Stitch Fix uses algorithms to drive every aspect of its business: “Algorithms help pick out clothes sent to customers in the mail, choose the clothes kept in inventory, assist with client communications, and have even started to design clothes. A computer vision algorithm ingests the Pinterest Pin boards to keep track of things customers found online that they love.” To the extent to which this vision correctly describes a new entrepreneurial opportunity, the only way to participate in value capture and sharing will be to be involved in the creation of these new ventures, not through a middle- or low-skilled labor market.

## **6 PLATFORMS AND ECONOMIC INCLUSION**

In the new digital era, many economic and personal interactions are mediated through platforms run by large technology companies. These platforms are able to amass uniquely detailed data sets, and use algorithms to decide what will be communicated, and who will be connected. The algorithms themselves can be set to optimize outcomes favoring whatever business model they choose. For advertising driven business models, for example, the algorithms can optimize on ‘engagement’, or time on site. Anyone seeking to innovate in these spaces has to navigate between these giant pre-existing platforms.

One recent example is the ‘Up Next’ recommender algorithm for videos used by YouTube. The videos recommended by YouTube can favor those that lead to highest time on site, not necessarily the highest quality or even mildly accurate videos. For example, one study of YouTube searches during the 2016 US presidential elections revealed that when searching the names of the candidates, there was a high incidence of “anti-Clinton conspiracy videos” being

recommended by the algorithm, rather than official information from the campaigns or high quality news outlets. “There were dozens of clips stating Clinton had had a mental breakdown, reporting she had syphilis or Parkinson’s disease, accusing her of having secret sexual relationships, including with Yoko Ono. Many were even darker, fabricating the contents of WikiLeaks disclosures to make unfounded claims, accusing Clinton of involvement in murders or connecting her to satanic and paedophilic cults.” (Lewis, 2018). Similar investigations also claim that searches for information on topics such as evolution, climate change, and vaccination tend to favor extreme points of view and conspiracy theories. These platforms have created and captured tremendous wealth through advertising, but has concentrated this wealth in relatively few hands.

Another recent example: the challenge that Amazon sellers will face getting visibility through the Alexa voice interface, as mentioned above. “The first problem for businesses is figuring out how to survive in a world where algorithms are starting to take more and more decisions away from consumers. For example, if I order something through my Alexa, rather than giving me every option on Amazon, Alexa’s algorithms will present me with at best one or two choices.” (Ravindran, 2018) Trying to navigate a world dominated by large platforms will be a major inclusion challenge.

## **7 NEW ENTREPRENEURIAL SKILLS**

What are the new skills that will allow entrepreneurs to thrive in a world of datafication, algorithms, and platforms to create new digital business models? One answer is to train more entrepreneurs to be coders and data scientists. However, this does not solve the inclusion problem—it arguably makes it worse.

There are other ways for entrepreneurs to take advantage of the platforms, data, and algorithmic capabilities discussed above. Allen (2019) offers a definition of digital entrepreneurship that includes a set of core skills, and a set of higher level capabilities that present new opportunities. The core skills start with choosing a business model, and positioning relative to existing competition. Many of the new digital models, such as content-based businesses, community-based businesses, or promotion, do not require extensive coding or math skills to start. Even more traditional models, such as an online store, are easy to launch from a technical point of view.

Other essential digital entrepreneurship skills include customer acquisition and digital marketing, prototype building, analytics, and user experience design and testing. Online services are available that allow the non-technical entrepreneur to be acting in each of these skill areas, with the possibility of increasing their effectiveness as they engage more intensely. The higher-level entrepreneurial capabilities include the ability to create or get access to better data than current solutions, and the ability to experiment with different products, customers, and business models.

Breaking down the digital entrepreneurship challenge into specific skill paths, whether using this scheme or others still to be proposed, will be one of our best tools for managing the complexity of this new digital era, and inviting and including people of many backgrounds to be digital innovators and entrepreneurs.

## **8 CONCLUSION: NEW DIGITAL VALUE SHARING**

How open is this new digital economy to new entrants, and the kind of innovation that would change how the value created by digitization is shared? Accountability to society at large comes in many different forms. In the world of private

business, it comes from accountability to regulators, to investors, to competitive labor markets, and above all to competitive consumer markets. In terms of introducing new business models, business accountability comes largely from new entrants, namely entrepreneurs, competing for profits. There is some evidence of increased market concentration in most industries, as well as pressure on new firm formation rates. Without new innovators and entrepreneurs, economic and social accountability will suffer.

One aspect of the inclusion problem pointed to by this diverse set of examples is the problem of introducing new business model innovations that will share value more widely. A business model describes at an abstract level how value is created for all parties, but more typically and specifically refers to how a business makes money by fulfilling a customer value proposition. Entrepreneurs search for a viable business model in their startup phase, later entering a period of optimizing an existing business model that already works to some degree (Ries, 2011). Increasing the ability of a broader set of entrepreneurs to search for viable new digital business models will be crucial. This goes beyond teaching the mechanics of coding and machine learning.

While keeping an eye out for emerging job roles that will rise in the inevitable disconnects between algorithms and reality, our main proposal is to radically increase societal ability to engage in digital entrepreneurship (Allen, 2019). Digital entrepreneurs can be taught to quickly prototype their business ideas online, create and/or access unique data sets, perform rapid experimentation, and be ready to shift between different business models as they learn more about their business ideas. Any content, discussion, existing business, or group can be turned into a small-scale business at first through multiple revenue models such as advertisements and referrals, sponsorships, transactions, sales, or even donations. At least part of the solution to inclusion should involve more entrepreneurial skill building in

the context of the new digital era, with entrepreneurs who are able to navigate and take advantage of giant platforms, complex and opaque algorithms, and unique data sets.

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